

KENYA STATE OF THE CITIES BASELINE SURVEY

STATISTICAL ABSTRACT FOR EMBU, KENYA

TABLE OF CONTENTS

Abbreviations	i
Kenya State of the Cities Survey: Cities Covered	ii
Acknowledgements	iii
Introduction	iv
Background	iv
Methodology	iv
Questionnaire	v
Data Quality	v
Table Presentation	v
PART A: HOUSEHOLD CHARACTERISTICS	1
A.1 Household Demographic Composition	1
A.2 Household Education Characteristics	1
A.3 Household Health Profile	4
PART B: HOUSEHOLD ECONOMIC PROFILE	5
B.1 Household Occupational Composition	5
B.2 Household Income/Expenditure Levels	7
B.3 Household Wealth Composition	9
B.4 Household Finance	10
B.5 Household-Owned Business Profile	11
PART C: DWELLING TENURE, SECURITY, AND CHARACTERISTICS	13
C.1 Household Dwelling Characteristics	13
C.2 Home and Land Ownership	15
C.3 Distribution of Housing Values and Rents	16
C.4 Neighborhood Social Capital and Civic Participation	17
PART D: INFRASTRUCTURE SERVICES	19
D.1a Water Access	19
D.1b Water Quality	21
D.2a Electricity and Waste-Disposal Services	22
D.2b Access to Sanitation Services	23
D.3 Access to Transport	25
D.4 Access to Communications	26
D.5: Access to Infrastructure Indicator	27
Conclusions	28

LIST OF TABLES

Table 1: Description of formats used to denote statistical significance	vi
Table A.1: Household demographic characteristics	2
Table A.2: Household education characteristics	3
Table A.3: Household health characteristics	4
Table B.1: Household members' main activity	6
Table B.2a: Monthly household spending power, as measured by expenditure	8
Table B.2b: Monthly household spending power, as measured by income	9

Table B.3: Household wealth composition	10
Table B.4: Household finance	11
Table B.5: Household-owned business profile.....	12
Table C.1: Household dwelling characteristics	14
Table C.2: Household residence and land tenure	15
Table C.3: Distribution of housing values and rents	16
Table C.4a: Neighborhood social capital and civic participation	17
Table C.4b: Neighborhood social capital and civic participation	18
Table D.1a: Water access.....	20
Table D.1b: Water quality.....	21
Table D.2a: Access to electricity and waste disposal	22
Table D.2b: Access to sanitation	24
Table D.3: Access to transport	25
Table D.4: Access to communications.....	26
Table D.5: Access to infrastructure indicator	27

LIST OF FIGURES

Figure 1: Development diamond	28
Figure 2: Infrastructure polygon	29
Figure 3: Living conditions diamond	29

ABBREVIATIONS

CAPI	Computer Assisted Personal Interview
EA	Enumeration area
GOK	Government of Kenya
HH	Household
HUD	U.S. Department of Housing and Urban Development
KIHBS	Kenya Integrated Household Budget Survey
KISIP	Kenya Informal Settlements Improvement Program
KMP	Kenya Municipal Program
KNBS	Kenya National Bureau of Statistics
NMSP	Nairobi Municipal Service Project
PDA	Personal Digital Assistant, in this case a hand held computer used by interviewers
PSU	Primary Sampling Unit
SMSA	Standard Metropolitan Statistical Area
SRS	Simple Random Sample
SSU	Secondary Sampling Unit
WB	World Bank
WBG	World Bank Group

ACKNOWLEDGEMENTS

The Kenya State of the Cities Baseline Survey was the result of the hard work, dedication, and support of many people. Within the World Bank, the work was coordinated and led by Sumila Gulyani (Lead Urban Specialist) and Wendy Ayres (Senior Economist). The report reflects the hard work of a team of experts from NORC who designed the survey instrument and sampling strategy, collected the data, and prepared the reports. These include Ray Struyk, Sarah Hughes, Sam Haddaway, Santanu Pramanik, Yvonne Cao, and Tasha Heidenrich. Clifford Zinnes of NORC at the University of Chicago oversaw production of all documents, including the statistical analysis and production of tables. Data collection was administered by a Kenyan firm, Infotrak Research and Consulting. Computer programming was in Stata and provided by Aaron Wilson. The Baseline Survey also benefited from the continued insights and guidance and of Ellen Bassett (Professor of Urban Planning, University of Virginia) and Debabrata Talukdar (Professor of Economics, School of Management, University of Buffalo), and from the contributions of Dean Cira, (Lead Urban Specialist), Sheila Kamunyori (Urban Specialist), and R. Mukami Kariuki (Lead Water and Sanitation Specialist).

The team acknowledges the support provided by the World Bank management, in particular Diarietou Gaye (Country Director for Kenya), Thomas O'Brien (Country Program Coordinator for Kenya), and Sameh Wahba (Practice Manager, GSURR). The team also thanks the Peer Reviewers for their support. These include Melanie Walker (Senior Adviser, EXC), Catalina Marulanda, (Lead Urban Specialist, GSU10), and Apurva Sanghi (Program Leader, Kenya).

Support for the preparation of the Kenya Baseline Survey was provided by Elizabeth Karuoya (Program Assistant) and Roderick Babijes (Program Assistant). The team also thanks the report's editor, Tony Sittoni, and graphic designers Paul Chikombe and Robert Waiharo. To them the team extends its gratitude.

The team is grateful for the support of the Government of Kenya at all levels, without which this survey would not have been possible. Especially important were the contributions of the Kenya National Bureau of Statistics, which provided critical inputs into the sample design. The contributions of the team at the Directorate of Urban Development, Ministry of Land, Housing, and Urban Development were also essential. The team wishes to thank the respondents to the survey, who generously contributed their time to enable the survey teams to collect crucial information on the state of the cities in Kenya.

Finally, the team wishes to thank the Government of Sweden, the Cities Alliance, and the Bill and Melinda Gates Foundation for their generous support for the preparation of the Kenya State of the Cities Baseline Survey. Without their support, this work would not have taken place.

INTRODUCTION

Background

The Kenyan government, with the support of development partners, is increasing its investments in urban infrastructure and services. To support these efforts, the World Bank has contracted NORC at the University of Chicago to carry out a baseline study of the demographic, infrastructure, and economic profiles of fifteen Kenyan municipalities: Nairobi City, Mombasa, Naivasha, Nakuru, Malindi, Eldoret, Garissa, Embu, Kitui, Kericho, Thika, Kakamega, Kisumu, Machakos, and Nyeri. This was undertaken in order to deepen understanding of the cities' growth dynamics, and to identify specific challenges to quality of life for residents. The study, called the "Kenya State of the Cities Baseline Survey," collects and analyzes household survey data to produce key statistics and identify differences in conditions among types of households—especially differences between those living in informal versus formal settlements. The ultimate goal is to use the information to establish development priorities for infrastructure and service investments and, eventually, to track the effectiveness of these investments.

Prior to the state of the cities survey, there were little data available to support the design of programme to improve infrastructure and related services in most Kenyan cities. While there have been several household surveys of Nairobi's informal settlements and numerous analyses using the data, few surveys or analyses have been carried out in other Kenyan municipalities or for modest-income areas in Nairobi. To facilitate access to the rich datasets generated by the survey, three written products were commissioned: a Statistical Abstract (such as this one) for each city, a City-at-a-Glance for each city (a two-to-three-page summary of the abstract), and an Overview Report (a more comprehensive discussion of the topics in this Introduction, a topic-by-topic comparative analysis of the fifteen cities, and appendices with the survey instrument). The abstract's objective is to provide comprehensive but easily accessible information on the wide range of municipal conditions covered in the survey, as reported by households. Some information in the abstract also comes from secondary sources, such as the national census and the Kenya Integrated Household Budget Survey (KIHBS). The primary audience for the Abstract includes policy makers, development practitioners, development partners, civil society organizations, and urban residents. Better planning and more productive investments can result from exploiting the information in each city's abstract.

Methodology

For this baseline household survey, NORC used a two and three-stage, stratified, clustered sampling design intended to be representative of poor and non-poor households living in formal and informal settlements in the fifteen cities included in the study. The first-stage sampling frame was based on Kenya's 2009 census frame of enumeration areas (EAs). In the census sample frame, EAs are identified as urban, peri-urban or rural. EAs are further identified as containing formal or informal settlement types. For the first stage sampling, NORC selected EAs from strata identified as informal (slum), urban-formal, peri-urban-formal and rural. In cases where the EAs were "large" (200 to 700 households), they were divided in half, thirds, or quarters and one segment was randomly selected.

For the final stage of sampling, NORC carried out a full household listing in each selected EA (or segment, as the case may be) and randomly selected ten households for interviewing.¹ Because expected response rates were unknown prior to data collection, interviewers were given a target to complete at least seven interviews in each EA. In Embu, 143 EAs were selected in the first stage.² In the second stage, a total of 10,684 households were listed and 1,520 households were selected.

The data for this report are based on 1,014 completed interviews carried out in Embu from July 14, 2012 to November 12, 2012 by a team of six interviewers and one supervisor. Among eligible households,³ the completion rate was 66.71%.⁴ Data collection took place in both formal and informal settlements simultaneously; 137 interviews were completed in informal and 877 were completed in formal ones.

Questionnaire

The Kenya state of the cities baseline questionnaire was developed iteratively using a base set of questions developed by the World Bank and refined to capture the key variables related to infrastructure access and municipal services of interest to the Kenyan government. The final fielded questionnaire is available in Volume II of the Overview Report. The household listing form and the questionnaire were programmed for use as a Computer-Assisted Personal Interview (CAPI) and both were carried out using 7-inch Samsung Galaxy Tab tablet computers which transmitted data to project servers via the mobile phone network. Interviewers used the tablet computers to capture GPS coordinates once during listing and again at the end of each interview.

Data Quality

Recorded administration time of the CAPI instrument showed a median duration of 24 minutes in Embu (21 minutes across all municipalities). However, duration values may have been compromised by transmission problems and supervisor reviews, which may have overwritten timestamps. Despite the uncertainty of exact durations, data quality measures do not show systematic interviewer-related errors in the final data. Approximately one-third of all interviews underwent validation, including call-backs by supervisors or central office staff (in-person and by phone).

Table Presentation

Each city's abstract includes a set of tables designed to provide basic information on households' economic and demographic conditions, their housing conditions, and access to infrastructure and services. One challenge in preparing the abstract was to provide a complete picture of conditions while still being selective in the information presented so as not to overwhelm the reader. A second challenge was to display the information in a way that permits stakeholders to understand conditions faced by different population groups.

To meet these challenges we have developed a set of tables with items believed to be most important for stakeholders and have broken down the items in several ways. In addition to providing an overall picture of household (HH) characteristics, the tables illustrate whether household characteristics differ

¹ A complete description of the sampling design is found in "Kenya Municipal Program State of Cities: Overview Report," NORC, August 2013.

² 142 EAs were included in the listing activity. One EA did not include households but rather consisted of a prison, and therefore was dropped from the sample

³ Eligible households are defined as occupied dwellings with at least one resident age 18 or older who is present during the field period.

⁴ The completion rate is the number of households that successfully completed an interview over the total number of households assigned.

by key factors. The rows of each table generally list the household characteristics (e.g., size of household, percentage of children in school). The columns present statistics for the entire city, then show how the data differs by location (informal vs. formal areas), household's poverty status (poor vs. non-poor), gender of the head of household (male vs. female headed, for informal areas only), as well as other factors pertinent to the particular table.⁵

From each table, one can quickly observe if there are large differences in household characteristics by location, spending power, etc., simply by comparing the cells (numbers). Each table also shows whether the observed differences are statistically significant.⁶ “Statistically significant” means that statistical analysis has revealed that a difference, no matter how small or large, is unlikely due to chance or randomness. In practice, statistically significant differences are the ones researchers are interested in—they can be interpreted as telling us about meaningful differences in household characteristics by location, spending power, gender, or other category. When we discuss differences in the text of this report, we will refer to “statistically significant” differences unless otherwise noted.

In terms of policy decisions, whether differences matter is a combination of whether they are statistically significant and how large the differences are. Ultimately, it is up to the policy practitioner to decide how large a difference must be to matter in the context of interest. An important note when interpreting results is that statistical significance does not imply causality. In other words, if differences in values are statistically significant, this does not mean that one variable caused a change in the other variable. Another factor may be influencing both variables; for example, we may find a “significant” difference between head of household education and household poverty, perhaps the key common cause is social status, which affects both their educational attainment and job/spending opportunities. Additionally, where a statistically significant difference is identified it does not imply the direction of the relationship. Perhaps the household poverty is the reason for the different education levels, or vice-versa. In this report, therefore, we will say a household characteristic is “associated with” or “correlated” with certain factors, rather than saying one is caused by another.

In order not to clutter the tables yet provide the reader with the maximum information, we mark statistically significant results in the tables with **bold** (for two adjacent values in the same row) and *italics* (to compare adjacent columns of data). Underlined values denote an insufficient number of household responses for some enumeration category of the sampling design to perform a test of statistical significance. The number of observations for a particular variable is noted in the tables in rows denoted by “N”. Cells with no observations are indicated with hyphens (-).⁷ The table, below, summarizes the formatting used in tables throughout the abstract: A value that is both **bold** and *italicized* indicates statistically significant differences for two adjacent cells (i.e., values in the same row) as well as for the distributions between adjacent columns. In contrast, a value in standard font—no bolding, italics, or underlining—still means that a significance test was performed but that the values under comparison were not statistically significantly different from each other. There is one caveat to the formatting rules

⁵ Informal/formal status was defined at the enumeration area level by the Kenya National Bureau of Statistics during the 2009 Census. Poor/non-poor is defined using the answer to a question asking respondents whether their total household expenditure in the last month was above or below a poverty line calculated using the household size (5,567 KSh for each adult 15 years and older + 3,619 KSh for each child aged 5 to 14 + 1,336 KSh for each child under 5 years old).

⁶ Statistical significance is noted when a test achieves a p-value ≤ 0.05 .

⁷ Regarding issues of non-response, both observational and item-specific, see Section 4, below.

that must be addressed regarding the significance testing of distributions. While the absence of *italics* sometimes means that the distribution was tested and was not found to be statistically significant, this is often not the case—i.e., there are many distributions which were not tested for significance. To avoid confusion, the comprehensive list of distributions which were tested for significance follow:

- **Table B.2a:** Expenditure ranges by location, tenure, water connection, business, skilled/unskilled head, and gender of household head (in informal areas)
- **Table B.2b:** Income ranges by location, tenure, water connection, business, skilled/unskilled head, and gender of household head (in informal areas)
- **Table C.3:** Distribution of home value ranges and rent ranges by location, tenure, water connection, business, skilled/unskilled head, and gender of household head (in informal areas)
- **Table D.1a:** Percent of households with a piped water connection inside their dwelling by security of ownership; percent of households with a piped water connection inside their compound by security of ownership; percent of households close to piped water access by security of ownership; cost of water by security of ownership; most important water source by security of ownership; reasons for no connection by security of ownership
- **Table D1.b:** Water source by water quality; water provider by water quality; water treatment buy water quality; treatment methods by water quality.

Table 1: Description of formats used to denote statistical significance

Format	When we use it	Example
Bold	Two bolded values in the same row next to each other indicate that the difference is statistically significant. We also use bold for ‘Yes’ or ‘No’ variables. If bold, it means that the difference between the mean of households that answered ‘yes’ (displayed) and the mean of those that answered ‘no’ (not displayed) is statistically significant. ^(a)	Table A.1 displays the mean household size for households located in formal and informal settlements; if the pair of values is bold, it means that the difference in household sizes between formal and informal areas is statistically significant. Table B.2 displays the proportion of households which own land (or have tenure) that fall below the poverty line. If bold, it means that this proportion is statistically significantly different from the proportion of households which do not own land that fall below the poverty line.
<i>Italics</i>	We indicate statistically significant differences between columns of three or more cells using italics; this means the difference between the entire distributions (columns) is statistically significant. ^(b)	Table B.2, Monthly household spending power, displays the distribution of households across income and expense ranges. If values appear italicized in both columns for households located in formal and informal settlements, the difference between the two distributions is statistically significant.
<u>Underline</u>	Denotes values where, due to lack of data at the census tract (enumeration area, or EA) level, it was not statistically possible to conduct the significance test. ^(c)	Table B.3 shows the mean value of households’ primary residence with and without land, and of any other residence and/or land. An underlined value means that due to lack of data at the census tract level, it is not possible to perform a test for significant differences.
Hyphen (-)	In cases where there are no data for a cell at all, we note that with a hyphen (-).	Table B.3 shows data related to household finance. For the percentages of households according to source of financing, the cells that display a hyphen means that there were no observations for that particular variable and category.

Notes:

a. Here a p-test from an Adjusted Wald test is conducted.

b. Here Pearson’s Chi-squared test is conducted.

c. At least two households are required to compute a household-level variance, which is required to conduct a hypothesis test. Note that this does not imply that the respective table values are based on just one household or even just one EA.

Another feature of the data worth mentioning is that outliers (responses that are very different from all the others) were not a major issue in the survey data, affecting just three variables in any important way.⁸

Finally, note that in tables presenting a distribution of responses, if some response categories are left out then the distribution will not add up to 100%. In cases where all response categories are listed, then the first row of responses is given as 100. Unless otherwise noted, all figures presented in the tables are percentages.

The core of this abstract comprises a set of tables divided into chapters. Each chapter contains a textual summary of each table and highlights some of their implications. The tables are divided into four groups:

- A. Household characteristics – 3 tables
- B. Economic profile – 5 tables
- C. Tenure, tenure security, dwelling characteristics – 4 tables
- D. Infrastructure services – 7 tables

Notes to the tables are identified by small letters appearing as superscripts at the end of each table. All tables present weighted figures at the household level, unless otherwise noted, to reflect the total population of the respective table cell. The N values, however, present the unweighted number of households, unless otherwise noted.

The final chapter of this abstract contains a series of three “Development Polygons”. These complement the detailed tables presented in sections A through D by illustrating an “overall” sense of the state of the city. The figures included are the Development Diamond, the Infrastructure Polygon, and the Living Conditions Diamond.⁹

While the tables generally have a common set of column headings, there is some variation. The following are definitions for those headings that require clarification:

- *Informal/Formal Areas* – This distinguishes between areas based on whether most households in the area have property title and official services. It is a designation provided by a status code at the level of the EA (Enumeration area) as used by the National Census.
- *Gender (Informal)* – For the households living in the locations coded as “Informal,” data for household characteristics are provided for both male- and female-headed households. As is standard, the male-headed households may contain the spouse while female-headed households do not.
- *Class (of durable)* – Durable assets are a standard measure of household wealth. They are grouped into three classes, roughly based on their likely market value and degree of permanence. The actual items in each class are indicated in the table. The values reported for these categories are the number owned by the household, not their average or total value.

⁸ Across all fifteen municipalities these were (i) home value, in which 20 responses were reported in millions units instead of as the value itself (so we simply divided these responses by a million); (ii) 40 respondents reported travel time for a weekly or monthly commute rather than a daily commute (these over-eight-hours responses were dropped); (iii) we removed one case in which the time to get water was over a week.

⁹ The basic format for all three figures appear in the World Bank Policy Research Working Paper, “Poverty, Living Conditions, and Infrastructure Access” A Comparison of Slums in Dakar, Johannesburg, and Nairobi” by Sumila Gulyani, Debabrata Talukdar, and Darby Jack (2010). We strived to make our own figures as similar as possible, though some deviations, noted in the accompanying text, were necessary.

- *Spending Power* – The total value of household expenditures collected by the survey, excluding rent or mortgage payments.
- *Access to Infrastructure* – This indicator combines six categories of infrastructure (divided into 13 subcategories) weighted by importance to the household and summed to create a household indicator from 0 to 9.5. See NORC (August 2013), “Kenya Municipal Program State of the Cities: Overview Report” for a more detailed description.
- *Household Poverty* – The poverty line varies depending on the number of members of the household and their age. It is calculated by adding together:
 - 5,567 KSh per month for each adult 15 years and older in household,
 - 3,619 KSh per month for each child aged 5 to 14 in household,
 - 1,336 KSh per month for each child under 5 years old in household.

HOUSEHOLD CHARACTERISTICS

This section presents basic household characteristics. Table A.1 provides information on household size and household member distribution by age category. Table A.2 details the level of education of the members of household, as well as the proportion of children and adults of different ages who were currently in school at the time of the survey. Finally Table A.3 presents household health characteristics, including the proportion of children under 15 who have received the BCG vaccine (an immunization against tuberculosis), a major public health concern given that Kenya is a high-tuberculosis-burden country.¹⁰ Table A.3 also includes the number of household members with an illness or injury in the two weeks prior to the survey, the proportion of those members who visited a health practitioner, average household medical expenditures for the month preceding the survey, and the percentage of households that have health insurance. All of these figures are given comprehensively and broken down by location type, the household's poverty status, and the gender of head of household (among informal areas).

A.1 Household Demographic Composition

The 2009 census estimated that the municipality of Embu had a population of 60,673, a 16% increase over the figure reported in the 1999 census; this represents of a 1.47% annualized average growth rate.¹¹ Our survey collected data from 1,014 households that, once weighted based on the survey design, represent 14,819 households.

The average household size in Embu, as reported by survey respondents, is 2.31 members. On average, about 78% of households' members are aged 15 to 60 years old, 10.7% are between 5 and 14 years old, while about 7.5% are under 5 and 3.6% are over 60. The head of household is female in 31% of all households. Compared to that for non-poor households, poor households have a higher mean percentage of household members between 5 to 14 years and over 60 years old. In contrast, a larger proportion of non-poor than of poor households are made up of members between 15 and 60 years old. There were no significant differences found between poor versus non-poor households in terms of the mean percentages of household members under 5 years old. Eighty-seven percent of female-headed households are located in formal areas, and 42% of female-headed households are poor, i.e. given their household size they have monthly expenditures below the poverty line.

A.2: Household Education Characteristics

Embu was part of the Eastern Province, where, in 2009, primary classrooms had an average class size of 32 students and secondary classrooms had on average 33 students. Student-teacher ratios in the former Eastern Province were, on average, 40:3 for primary schools and 19:1 for secondary schools.¹²

¹⁰ World Health Organization Global tuberculosis report 2012, retrieved June 12th 2013 from http://www.who.int/tb/publications/global_report/en/

¹¹ From Statistical Abstract 2010 and Statistical Abstract 2006, Kenya National Bureau of Statistics.

¹² Provinces no longer exist in Kenya. This data is based on the Kenyan Institute for Public Policy Research and Analysis 2009 Economic Report, Table A3.16, pg. 192, per Ministry of Education statistics, http://www.marsgroupkenya.org/pdfs/2009/10/Kenya_Economic_Report_2009.pdf Section

Table A.1: Household demographic characteristics

Characteristic	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Number of households:							
Weighted	14,819	1,966	12,853	7,162	7,510	9,926	4,541
N (unweighted)	1,014	137	877	470	537	88	43
Size of household	2.31	2.19	2.33	2.61	2.02	2.22	1.91
N	1,014	137	877	470	537	88	43
Mean percent of household members aged:							
Total	100	100	100	100	100	100	100
Under 5	7.5	7.2	7.5	7.6	7.1	7.1	5.6
5 to 14	10.7	8.4	11.0	12.8	8.9	7.3	11.8
15 to 60	78.2	80.1	78.0	74.5	82.1	82.5	77.0
Over 60	3.6	4.3	3.5	5.0	2.0	3.0	5.5
N	1,014	137	877	470	537	88	43
Proportion of households...							
Male-headed	69	68	69	73	64		
Female-headed	31	32	31	27	36		
N	989	131	858	460	522		
Female-headed distribution		13	87	42	58		
N		318	317				

The first panel of Table A.2 presents statistics on the education of all individuals aged 5 years and older within the surveyed households. Less than half of all individuals, 44%, have completed secondary school or higher—a figure that is likely skewed by the fact that the majority of household members are between 15 and 60 years old—and 69% completed primary or higher. A significantly higher percentage of household members in poor areas completed some or all of primary than did so in non-poor areas; on the other hand, significantly more household members in non-poor areas completed secondary (32%, vs. 26% for poor areas) or higher education (25%, vs. 8% for poor areas). Having “no education” is rare but the difference of those households with no educated members is statistically significant between poor and non-poor households (5 vs. 1%, respectively). In informal areas, members in female-headed households are more likely to have ended their education after completing some primary school while members in male-headed households are more likely to have completed secondary school; although these differences proved not statistically significant. As already mentioned in the introductory section, all data-related statements in this abstract are based on statistically significant figures, otherwise indicated.

The second panel of the table shows the mean percent of adult individuals over 18 years within each household. This is done to show intra-household educational levels among households’ adult members. We find that on average, 57.6% of an Embu household’s adults have completed secondary school or higher (almost 36% completed secondary, while 21.7% completed higher education). About 3.6% of a household’s adults had no education whatsoever. The remaining 38% completed some primary, all of primary, or some secondary schooling. We also found interesting differences between poor and non-poor households, which were skewed toward post-secondary in the way one would expect:

Table A.2: Household education characteristics

Characteristic	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Percent of individuals 5 and older with highest grade completed:							
Total	100	100	100	100	100	100	100
None	3	4	3	5	1	1	4
Some primary	28	30	27	32	22	28	37
Completed primary	14	12	15	18	10	13	13
Some secondary	11	9	11	12	10	12	5
Completed secondary	28	33	28	26	32	30	33
Higher	16	12	16	8	25	15	9
N	2,036	263	1,773	1,084	939	175	73
Mean percent of household's adults over 18 with highest grade completed:							
Total	100	100	100	100	100	100	100
None	3.6	2.9	3.7	5.8	0.9	0.9	2.5
Some primary	10.7	17.9	9.6	14.7	6.6	18.6	16.7
Completed primary	16.1	13.1	16.6	22.1	10.7	15.5	10.2
Some secondary	11.2	9.7	11.5	13.5	9.3	11.4	7.8
Completed secondary	35.9	41.6	35.0	33.9	38.4	37.9	47.0
Higher	21.7	14.0	22.9	9.7	32.9	15.7	12.7
N	1,014	137	877	470	537	88	43
Percent of individuals in school by age group:							
5 to 14	93.1	<u>90.9</u>	<u>93.4</u>	<u>93.5</u>	<u>92.6</u>	<u>85.5</u>	<u>100.0</u>
N	276	<u>31</u>	<u>245</u>	<u>160</u>	<u>116</u>	<u>20</u>	<u>10</u>
15 to 18	80.2	<u>72.6</u>	<u>80.8</u>	<u>78.6</u>	<u>82.9</u>	<u>65.4</u>	<u>100.0</u>
N	103	8	95	65	37	6	2
Over 18	7.9	6.2	8.1	8.6	7.1	3.9	12.0
N	1,014	137	877	470	537	88	43

in poor households, a significantly higher percentage of household's adults only completed some or all of primary school or some secondary school, while a significantly lower percentage completed higher education past secondary (9.7%, versus 33% in non-poor areas). In informal areas, a significantly lower percentage completed higher education than in formal areas; on the other hand, a significantly higher percentage only completed some primary.

Ninety-three percent of individuals aged 5 to 14 years old are currently in school; this figure is 80.2% for individuals 15 to 18 and almost 8% for individuals over 18. There were not enough observations within some enumeration areas to determine statistical significance of the differences between formal and informal areas, poor and non-poor households, or by the gender of household heads for people under 18 years old.

A.3: Household Health Profile

Embu was part of Eastern Province, which in 2005 had an average of 8.8 doctors and clinical officers per 100,000 residents and 49 nurses per 100,000 residents.¹³ The former Eastern Province had almost 11 medical facilities per 100,000 residents, including hospitals, clinics, dispensaries, and other types of facilities.¹⁴

Overall, 92% of households' report their children under 15 to have received BCG (tuberculosis) immunizations. Fourteen percent of households had a sick or injured household member in the two weeks prior to the interview. Eighty-one percent of these visited a health practitioner in the previous two weeks. Rates of health insurance coverage is low (27%), and vary significantly by area type (28% in formal areas vs. 19% in informal areas) and poverty (39% in non-poor households vs. 14% in poor households).

Table A.3: Household health characteristics

Characteristic	All	Location		HH poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Percent of household's children under 15 having received BCG immunization	92	<u>93</u>	<u>92</u>	<u>93</u>	<u>92</u>	<u>91</u>	<u>100</u>
N	408	50	358	224	182	33	14
Percent of households with an injured/ill member, previous two weeks	14	18	13	15	13	17	14
N	1,014	137	877	470	537	88	43
Percent of ill household members that visit a health practitioner, previous two weeks	81	<u>88</u>	<u>80</u>	<u>80</u>	<u>82</u>	<u>95</u>	<u>100</u>
N	135	24	111	68	65	14	6
Household medical expenditures (KSh), previous month	472	461	473	420	512	566	284
N	1,002	135	867	465	530	88	42
Percent of households with health insurance	27	19	28	14	39	22	17
N	1,014	137	877	470	537	88	43

¹³ 2004/2005 numbers of healthcare providers obtained from Partners for Health Reformplus 2006 Report, Table A1, pg. 39, Annex A, statistics obtained from Rep. of Kenya. www.healthsystems2020.org/files/1654_file_Tech101_fin.pdf. Per capita figures calculated by dividing by 2005 (estimated) population obtained from the Kenya Integrated Household Budget Survey, Table 3.1, [http://www.knbs.or.ke/pdf/Basic%20Report%20\(Revised%20Edition\).pdf](http://www.knbs.or.ke/pdf/Basic%20Report%20(Revised%20Edition).pdf).

¹⁴ Based on most current (undated) figures from Kenya Bureau of Statistics Open Kenya online database, <https://kenya.socrata.com/Health-Sector/Health-Facility-Pie-Chart/yr4-763w>. Per capita figures calculated by dividing by 2009 census population, obtained from 2010 Statistical Abstract, Kenya National Bureau of Statistics.

HOUSEHOLD ECONOMIC PROFILE

B.1: Household Occupational Composition

Table B.1 presents the main activity of household members. The first panel shows the percent of all adults over 18 in each of the occupations. The five most prominent occupation categories are casual employee, regular employee, self-employed, homemaker, unemployed looking for work, and student, which together comprise about 86% of all adults in Embu over 18 years old. Individuals in non-poor households are significantly more likely to be regular and casual employees than individuals in poor households, and are significantly less likely to be homemakers, unemployed and not looking for work, and apprentices. Individuals in informal areas are significantly more likely to be unemployed and looking for work than individuals living in formal areas. One interesting and statistically significant finding is that members of female-headed households in informal areas are four times as likely to be students as members of male-headed households.

The second panel shows the average percent of adults over 18 within each household that are occupied in each of the categories. This is done to show intra-household occupational status among households' adult members. The results here are similar to those in the first panel above. Here, we find that on average, more than two thirds, about 68% of a household's adult members are either regular employees, casual employees, or self-employed. About 9% are homemakers, 5.6% are unemployed but looking for work, and 5.7% are students; no other category includes more than 2.3% of adult household members. Our survey found that in informal areas, the average percent of adults that are casual employees is significantly higher than in formal areas (33.6%, vs. 32% in formal areas); the same holds true for those unemployed but looking for work (10.5% vs. 4.9% in formal areas). Among non-poor households, the average percent of adults who are regular employees and self-employed are considerably larger than the average percent in poor households (29.4% in non-poor vs. 11% in poor, and 19.3% in non-poor vs. 11.6% in poor, respectively), while the average percentages of adults who are casual employees, homemakers, apprentices and unemployed non-looking for work is significantly less than in poor areas. Another significant difference we observe is related to the proportion of members of male- and female-headed household members that are students and homemakers. On the one hand, female-headed households contain a considerably higher percentage of adults who are students (11.3%, vs. 1.2% in male-headed household members), and on the other hand, male-headed household members contain significantly higher average percentages of adults who are homemakers (6.2%, vs. 2.2% in female-headed household members). This suggests that female-heads are allowing more of their household members to attend school than male-heads.

Table B.1: Household members' main activity

Occupation ^a	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Percent of adults over 18 with occupation:							
Employer	0.1	0.0	0.1	0.0	0.1	0.0	0.0
Regular employee	18.3	15.0	18.8	10.1	27.4	16.8	15.7
Casual employee	28.3	30.6	27.9	30.5	26.1	33.2	31.8
Self-employed	15.3	19.3	14.7	12.1	19.2	19.0	20.5
Unpaid family worker	2.3	1.8	2.4	2.4	2.2	2.8	0.0
Apprentice	0.9	0.0	1.0	1.4	0.3	0.0	0.0
Student	6.1	4.5	6.4	6.0	6.3	2.6	10.8
Pensioner/investor	1.1	0.9	1.2	1.0	1.3	0.4	1.4
Earning from investments/ property	3.9	5.4	3.6	4.3	3.3	6.4	4.8
Sick/unable to work	0.8	0.3	0.9	1.2	0.0	0.0	0.0
Unemployed looking for work	7.0	13.0	6.1	7.5	6.7	9.4	10.1
Unemployed, not looking for work now	3.0	1.1	3.3	4.3	1.6	1.7	0.0
Homemaker	10.9	7.3	11.4	16.2	5.0	7.7	2.4
N	1,567	217	1,350	804	751	144	59
Mean percent of household's adults over 18 with occupation: ^b							
Employer	0.1	0.0	0.1	0.0	0.2	0.0	0.0
Regular employee	20.5	17.5	21.0	11.0	29.4	17.8	19.7
Casual employee	32.2	33.6	32.0	36.7	28.1	37.9	28.6
Self-employed	15.5	18.2	15.1	11.6	19.3	16.2	20.3
Unpaid family worker	1.6	1.5	1.7	2.0	2.0	2.3	0.0
Apprentice	0.7	0.0	0.8	1.1	0.2	<u>0.0</u>	<u>0.0</u>
Student	5.7	4.2	5.9	5.2	6.0	1.2	11.3
Pensioner/investor	0.8	1.0	0.7	0.8	0.8	0.3	2.0
Earning from investments/ property	3.4	5.8	3.1	3.5	3.3	6.8	4.6
Sick/unable to work	0.9	0.2	1.0	1.3	0.0	0.0	0.0
Unemployed looking for work	5.6	10.5	4.9	5.9	5.4	9.9	9.0
Unemployed, not looking for work now	2.3	0.9	2.5	3.4	1.2	1.4	0.0
Homemaker	8.9	6.0	9.3	14.5	3.7	6.2	2.2
N	1,014	137	877	470	537	88	43

Notes:

a. The category "Other" has been omitted.

b. These numbers are obtained by first computing the percentages of each household's members in each category, and then taking the mean of these percentages over all households.

B.2: Household Income/Expenditure Levels

There are two general approaches to measure spending power: expenditure and income, both of which are shown in the tables below. In the survey, income derives from household members' salaries, business earnings, rents, public cash support, and earnings from financial assets in the month prior to the interview, but does not include any remittances. Expenditures include all purchases, including investments for household-owned businesses. In theory, both approaches express the same amount of spending power, but typically one approach is not enough, especially when estimations are based on survey data. This is because survey respondents' perceptions about their income and expenditures can be unreliable; estimates vary depending on seasonal changes in economic activities, type of assets owned, household's cash flows, and in-kind payments.

In practice, the expenditure approach is usually more accurate because most respondents, making purchases daily, recall their expenses better. Income, on the one hand, can be problematic because it can be subject to respondent misreporting (e.g., desire to impress the enumerator) and, with non-wage income; respondents do not generally make a clear distinction between revenue (sales) and income (revenue minus expenses). Using both methods, therefore, provides an additional level of verification.

About half (49%) of all households have monthly expenditures below the poverty line (which is determined by the household composition). This proportion is considerably lower when the head of household works either in a "skilled" profession (35%, vs. 54% un-skilled occupation if household head). Likewise, it is significantly lower when the household owns a water connection to when it does not. An interesting fact about poverty is that a large proportion of households that reported ownership of their structure, land, or both was poor (63%), a considerably higher rate than that calculated upon all households.

Income and expenditure distributions vary significantly depending on type of settlement (income only), tenure status, water connection, business ownership, and whether the household head is skilled. Whether a household owns a water connection is a particularly strong predictor of income and expenditure levels—households with a water connection are more likely to fall into the highest income/expenditure categories and significantly less likely to be below the poverty line.

On average, households who sent money to individuals outside their household sent around 4,757 KSh in the three months prior to the interview, and those that received money received, on average, almost 9,889 KSh in the same period. Households were more likely to send money than to receive it, and wealthier households were much more likely to send money—89% of households in the top expenditure category sent money to friends or relatives, compared to only 9% of those in the bottom. Also, there are more moderate but still considerable differences in the proportion of households receiving remittances (transferred income) across expenditures categories (23% of households in the bottom expenditure category, vs. only 9% of them in the top expenditure category).

Table B.2a: Monthly household spending power, as measured by expenditure

Characteristic	All	Location		Household has...			House hold head is ^c		Gender (Informal)		Value of transfer (row pct.) ^d
		Informal areas	Formal areas	Tenure ^a	Water connection	A business ^(b)	Skilled	Unskilled	Male-headed	Female-headed	
Percent of HHs below poverty line	49	55	48	63	26	44	35	54	58	47	
N	1,007	134	873	197	301	205	312	695	85	43	
Mean expenditure (monthly KSh)	13,933	14,308	13,875	14,788	26,423	21,237	18,233	12,145	16,885	9,188	
N	1,014	137	877	199	304	207	316	698	88	43	
Percent of households with expenditure: ^d											
Less than 3,000 KSh	7	10	6	16	0	1	2	9	12	7	2,551 (9%)
3,001-6,000 KSh	19	30	17	16	3	10	9	23	32	25	3,174 (16%)
6,001-9,000 KSh	19	20	18	17	8	14	16	20	18	30	4,102 (33%)
9,001-30,000 KSh	20	15	21	17	15	23	19	20	13	16	5,512 (35%)
13,001-18,000 KSh	18	11	19	14	27	19	29	13	11	13	4,798 (49%)
18,001-30,000 KSh	12	8	12	12	26	19	15	10	7	9	5,099 (60%)
31,001-75,000 KSh	5	2	6	7	16	9	9	3	3	0	12,797 (81%)
Above 75,000 KSh	2	4	1	2	5	5	2	1	6	0	32,252 (89%)
N	1,014	137	877	199	304	207	316	698	88	43	396
Cash transfers ^e	4,757	1,219	5,173	11,323	10,406	6,844	4,353	5,022	2,135	879	
N	240	24	216	53	57	50	46	194	11	11	

Notes:

- Household possesses deed or other officially recognized document conferring ownership of the structure, land, or both.
- "Business" refers to a self-employed activity that may or may not entail household or wage employees.
- Includes those self-declared as "skilled" as well as "professional".
- An imputed 30-day value from responses over several periods (7 days for food, 30 days for other consumables, 12 months for durables and annual services). See Volume I in the Overview Report. No significance test performed on this column.
- Transfers are cash outflows over last three months averaged over households with such flows (equal to proportion of row households in parentheses).

Table B.2b: Monthly household spending power, as measured by income

Characteristic	All	Location		House hold has...			House hold head is ^c		Gender (Informal)		Value of remittance (row pct.) ^d
		Informal areas	Formal areas	Tenure ^a	Water connection	A business ^b	Skilled	Un-skilled	Male-headed	Female-headed	
Proportion of households with income: ^(d)											
Less than 3,000 KSh	7	15	6	4	0	3	0	10	14	20	4,030 (23%)
3,001-6,000 KSh	19	26	18	16	3	9	10	23	30	17	3,301 (25%)
6,001-9,000 KSh	22	24	22	16	11	24	15	26	24	25	7,865 (23%)
9,001-30,000 KSh	16	14	16	15	11	20	17	16	7	23	4,486 (24%)
13,001-18,000 KSh	11	7	12	15	15	15	16	10	8	6	13,420 (22%)
18,001-30,000 KSh	14	6	15	16	28	15	23	10	6	3	12,245 (11%)
31,001-75,000 KSh	9	7	10	14	27	11	18	5	8	5	14,395 (14%)
Above 75,000 KSh	1	2	1	2	4	3	1	1	2	0	900,000 (7%)
N	944	134	810	176	288	205	308	636	88	41	194
Cash remittances ^e	9,889	<u>4,134</u>	<u>10,536</u>	<u>17,363</u>	<u>24,263</u>	<u>18,346</u>	<u>8,389</u>	<u>10,253</u>	<u>2,682</u>	<u>6,160</u>	
N	240	24	216	53	57	50	46	194	11	11	

Notes:

- Household possesses deed or other officially recognized document conferring ownership of the structure, land, or both.
- "Business" refers to a self-employed activity that may or may not entail household or wage employees.
- Includes those self-declared as "skilled" as well as "professional".
- Total household cash income in KSh, previous month, not including in-kind income or cash assistance from/to family or friends who live outside the household. No significance test performed on this column.
- Remittances are cash inflows over last three months averaged over households with such flows (equal to proportion of row households in parentheses).

B.3: Household Wealth Composition

The "household wealth index" is calculated from the household's declared ownership of a list of common household items. The value itself is created by totaling the estimated value of each item (indicated in brackets, in USD), converting to KSh, and dividing by 1,000; so the average of 23.9 means that the average household owned approximately KSh 23,900 worth of listed possessions. However, since each possible possession was only counted once, this should not be taken as a reliable estimate, but rather a unit-less index of comparison.

This value is significantly higher in formal than informal areas, non-poor vs. poor households, and male- vs. female-headed households (in informal areas). There are significant differences by area type and poverty status in the holdings of Class-1 and Class-2 durables, farm animals and entertainment equipment. A subtle difference of access to Class-3 durables is registered between poor and non-poor households, and the tenancy of farm animals and motorized transport also registered small but significant difference according to the gender of the household-head.

Table B.3: Household wealth composition

Characteristic	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Index of household wealth ^a	32.8	25.4	33.9	29	36.2	29.1	18.2
N	1,014	137	877	470	537	88	43
Household's average holdings of:							
Class-1 durables (furniture, pans, iron, mosquito net) [7]	5.6	5.1	5.7	5.2	6.0	4.8	5.5
Class-2 durables (stove, sewing machine, fan, wheelbarrow, water storage tank) [60]	1.2	1.0	1.2	1.1	1.3	0.9	1.1
Class-3 durables (refrigerator, washing machine, electric generator, bicycle) [100]	0.2	0.2	0.2	0.1	0.2	0.2	0.1
Farm animals (poultry and livestock) [200]	0.3	0.1	0.4	0.4	0.2	0.1	0.0
Entertainment equipment (radio, TV, satellite dish, DVD, video player) [80]	1.8	1.4	1.8	1.4	2.1	1.5	1.3
Motorized transport (motorcycle [400], car [1,000])	0.1	0.1	0.1	0	0.1	0.1	0.0
N	1,014	137	877	470	537	88	43
Value of primary residence, not its land (in 1,000 KSh)(b)	153.1	<u>562.8</u>	<u>54.5</u>	<u>211.2</u>	<u>54.8</u>	<u>637</u>	<u>637</u>
N	32	7	25	20	11	6	1
Value of primary residence and its land (in 1,000 KSh) ^b	1,475	<u>1,140</u>	<u>1,729</u>	<u>1,140</u>	<u>1,729</u>	<u>1,439</u>	<u>10,000</u>
N	75	7	68	32	43	5	1
Value of other land and/or residence (in 1,000 KSh) ^c	575	<u>10</u>	<u>606</u>	<u>166</u>	<u>713</u>	<u>10</u>	-
N	21	1	20	5	16	1	0

Notes:

- This is a class-weighted average of the number of items as disaggregated in this same table, multiplied by the weight given within the square brackets [].
- About 89% of the sample had missing values for this amount, though at about the same frequency across the categories of this table. About half the sample that declared owning land or a residence failed to report its value. Averages are only over households with the asset. See "Proportion of Owners" in Table C.1. Please, note that values in the last three rows of the table are divided by one thousand.
- Since the survey does not ask the value of these, they have been imputed as a percent of primary residence value where it was declared (see Footnote (c)). These imputations are: land in city (10%), land outside city (5%), residence only in city (40%), and residence only outside of city (28%). If household has both land and structure these are scored separately and added together. In the case where the land of primary residence is not owned the value of the residence is first doubled before the imputations are made.

Home values are relatively concentrated. The high number of missing or don't know responses to this question means that the averages shown are drawn from a relatively small group and tests of statistical significance were not possible.

B.4: Household Finance

Around 62% of all households in Embu have a bank account, a number that differs significantly between area type and poor and non-poor households. However, the percentage of households with loans is extremely low, and most loans (5% of households) are obtained from banks. Consistent with findings mentioned above, far more households (41%) sent money to people not living at the household than received money (27%). Significantly fewer poor households and households in informal areas send money than non-poor households and households in formal areas.

B.5: Household-Owned Business Profile

Twenty-one percent of households own a business. The only significant difference in business ownership is between households in formal and informal areas (19% vs. 32%). Nevertheless, the relatively low number of businesses means that it is not possible to perform tests of statistical significance for most of fields in Table B.5.

Table B.4: Household finance

Characteristic	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Percent of households with a bank account	62	54	64	45	79	55	51
N	1,014	137	877	470	537	88	43
Percent of households with a loan	15	13	16	11	20	14	13
N	1,010	137	873	470	533	88	43
Percent of households with a loan from a...							
Bank	5	4	5	3	6	55	51
Microfinance institution	3	2	3	2	4	1	3
Savings/credit group or co-op	6	7	6	3	8	9	2
Relative/friend	4	2	4	4	4	1	6
Informal lender	0	0	0	0	0	0	0
N	1,014	137	877	470	537	88	43
Percent of HHs receiving cash from those not now living at residence ^(a)	27	21	28	28	25	16	28
N	1,013	137	876	470	536	88	43
Percent of HHs sending cash to those not now living at residence ^(a)	41	31	43	31	52	30	35
N	1,014	137	877	470	537	88	43

Notes:

a. Over the previous twelve months.

Table B.5: Household-owned business profile

Characteristic	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Rate of HH business ownership, last 12 months	21	32	19	19	23	31	30
N	1,014	137	877	470	537	88	43
Type of business: ^a							
Manufacturing	3	<u>7</u>	<u>2</u>	<u>5</u>	<u>1</u>	<u>6</u>	<u>6</u>
Selling	74	<u>81</u>	<u>72</u>	<u>75</u>	<u>73</u>	<u>74</u>	<u>94</u>
Transport	9	<u>8</u>	<u>10</u>	<u>6</u>	<u>12</u>	<u>14</u>	<u>0</u>
Professional (including Internet)	0	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>
Other (barber, cleaning, etc.)	16	<u>4</u>	<u>19</u>	<u>16</u>	<u>16</u>	<u>6</u>	<u>0</u>
N	207	42	165	91	114	26	12
Years in operation	1.4	<u>2.3</u>	<u>1.1</u>	<u>1.3</u>	<u>1.4</u>	<u>1.5</u>	<u>4.6</u>
N	206	42	164	91	113	26	12
Number of employees	1.9	<u>1.9</u>	<u>1.9</u>	<u>1.9</u>	<u>2</u>	<u>2.4</u>	<u>1</u>
N	207	42	165	91	114	26	12
Which are							
Household members	1.4	<u>1.3</u>	<u>1.4</u>	<u>1.5</u>	<u>1.3</u>	<u>1.5</u>	<u>0.9</u>
N	207	42	165	91	114	26	12
Non-household members	0.5	<u>0.5</u>	<u>0.5</u>	<u>0.4</u>	<u>0.7</u>	<u>0.9</u>	<u>0.1</u>
N	206	42	164	91	113	26	12
Revenue in previous month ^b	19,584	<u>5,899</u>	<u>22,758</u>	<u>12,451</u>	<u>25,103</u>	<u>9,118</u>	<u>2,080</u>
N	160	30	130	69	89	18	9
Registration status:							
Local authority (municipal or city council)	42	<u>33</u>	<u>44</u>	<u>34</u>	<u>49</u>	<u>35</u>	<u>21</u>
Kenya Revenue Authority	14	5	16	11	16	9	0
Registrar of Companies	5	5	5	7	4	9	0
None of the above	53	66	49	62	45	63	79
N	207	42	165	91	114	26	12
Share of businesses making fiscal contributions:							
Daily market local fee	35	39	35	37	34	29	57
Single business permit local fee	37	<u>27</u>	<u>40</u>	<u>31</u>	<u>42</u>	<u>28</u>	<u>19</u>
Value Added Tax	14	<u>5</u>	<u>16</u>	<u>13</u>	<u>14</u>	<u>9</u>	<u>0</u>
N	207	42	165	91	114	26	12

Notes:

a. Households were allowed to choose more than one category so these figures may exceed 100%.

b. Average over only those businesses operating over the period.

DWELLING TENURE, SECURITY, AND CHARACTERISTICS

C.1: Household Dwelling Characteristics

On average, households in Embu have 1.3 people per room, a ratio that significantly differs by household poverty (1.5 in poor, vs. 1.2 in non-poor). Households have less than one bathroom on average. Thirty-two percent of households have a kitchen. This proportion is higher in formal settlements (33%) than in informal (24%) and higher among non-poor households (40%) than poor households (24%).

Most households in Embu cook with charcoal, firewood or gas. A significantly higher percentage of households in informal areas use paraffin or kerosene, while a significantly lower percentage uses firewood. A significantly lower proportion of poor households use gas than do non-poor households; on the other hand, significantly larger proportions of poor households use firewood than do non-poor ones.

Seventy percent of households are renters, 23% of them own their land and structure, and 5% own the structure of their dwelling only. The proportion of households in formal settlements that own their land structure is twice as large as that of households in informal areas (24 vs. 12%), and a considerably larger proportion of poor households own both their land and structure than non-poor households (29 vs. 16%) in this city. In addition, significantly more non-poor households than poor households are renters (80 vs. 61%), and a larger proportion of them tend to concentrate in informal settlements (78 vs. 69% of households in formal areas).

Embu respondents reported lower rates of natural and manmade hazards than in other cities that participated in this survey. Only 8% of households report that the area around their dwelling floods during heavy rains, 8% said they suffered mudslides, 32% say they live within a ten-minute walk of a formal or informal garbage dump, and 1% state that they are exposed to factory pollution in their neighborhood. The proportion of households that flood during the rainy season and of those who are located in areas that register mudslides is more concentrated in informal areas than in formal areas.

Quality of housing varies widely across location. Twenty-nine percent of households in informal areas have an earth or clay floor, compared to 10% of those in formal areas. Also, 19% of poor households have this type of floor, compared to only 6% of non-poor households (both significant differences). Almost all households have an iron or grass roof, though the proportions are significantly different in formal vs. informal areas and in poor vs. non-poor households. Only 59% of households have stone or brick walls; although the latter is more common in formal areas than informal areas, and in non-poor households than in poor households.

Table C.1: Household dwelling characteristics

Characteristic	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Number of persons per room	1.3	1.5	1.3	1.5	1.2	1.5	1.4
N	1,012	137	875	469	536	88	43
Number of bathrooms	0.5	0.4	0.5	0.4	0.6	0.5	0.3
N	1,014	137	877	470	537	88	43
Proportion of residences with kitchen	32	24	33	24	40	21	29
N	1,014	137	877	470	537	88	43
Primary cooking fuel:							
Electricity	1	3	0	1	0	4	0
Paraffin or kerosene	19	26	18	18	20	25	26
Gas	24	19	25	11	37	24	13
Charcoal	31	36	30	32	29	27	46
Firewood	26	16	27	37	13	19	15
N	846	115	731	412	427	66	43
Proportion of households that:							
Total	100	100	100	100	100	100	100
Owens the land only	0	1	0	0	0	0	2
Owens structure only	5	8	4	6	3	9	6
Owens land and structure	23	12	24	29	16	11	10
Rents	70	78	69	61	80	78	80
Squats	2	1	2	3	1	1	2
N	1014	137	877	470	537	88	43
Pct. of HHs in areas subject to ^a :							
Flooding ^b	8	28	4	8	7	31	24
Mudslides ^c	8	16	6	7	7	20	12
10 minute walk to formal or informal garbage dump	32	36	31	29	34	35	39
Factory pollution (air, water, noise)	1	0	1	1	1	0	0
N	1,014	137	877	470	537	88	43
Housing quality:							
Pct. with earth/clay floor	12	29	10	19	6	34	17
Percent with corrugated iron roof	96	99	95	97	95	99	100
Percent with grass roof	0	0	0	1	0	0	0
Percent with stone/brick/block walls	59	44	62	45	73	43	49
N	1,014	137	877	470	537	88	43

Notes:

- All data is self-reported, and therefore subjective.
- Households reported that the area floods during heavy rains.
- Households reported that they are located on a hillside that is subject to mudslides.

C.2: Home and Land Ownership

Seventy percent of households are renters, 23% of them own their land and structure, and 5% own the structure of their dwelling only. Ninety-one percent of households owning their structure reported feeling secure in their ownership.

Table C.2: Household residence and land tenure

Characteristic	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Percent of households that:							
Total	100	100	100	100	100	100	100
Own the land only	0	1	0	0	0	0	2
Own structure only	5	8	4	6	3	9	6
Own land and structure	23	12	24	29	16	11	10
Rent	70	78	69	61	80	78	80
Squat	2	1	2	3	1	1	2
N	1,014	137	877	470	537	88	43
Percent of HHs that feel secure in ownership	91	72	93	93	89	74	55
N	199	17	182	120	77	9	6
Variability of households feeling secure ^a	91	72	93	93	89	74	55
N	199	17	182	120	77	9	6
Percent of HHs that experienced eviction	2	8	1	3	1	12	0
N	1,014	137	877	470	537	88	43
Proportion of HH owners by type of land-possession document:							
Total	100	100	100	100	100	100	100
None	19	33	18	18	22	42	28
Freehold title	66	44	68	66	66	23	72
Temporary occupation license	0	0	0	0	0	0	0
Share certificate	2	0	2	3	0	0	0
Government certificate of title ^b	4	14	3	4	3	22	0
Letter from chief (provincial administration)	2	0	2	2	0	0	0
Other	8	9	7	7	8	14	0
N	242	21	221	138	102	13	6
Neighborhood mobility							
Years in dwelling	6.4	7.9	6.2	7.6	5.1	6.3	7.3
N	1,014	137	877	470	537	883	88
Years in neighborhood	8.3	9.6	8.1	10.1	6.4	8.2	8.7
N	1,014	137	877	470	537	88	43
Home loan payment as a percent of spending power ^c	45	21	49	60	36	21	-
N	20	3	17	8	11	3	0

Notes:

- Computed as the intra-class correlation coefficient, where the "class" is the EA. This measures the extent to which households within an EA resemble each other in their feelings of security in ownership. No significance tests performed on this row.
- Long-term lease from City council/Government.
- Computed only for those with a housing loan.

Most household owners (66%) reported having a freehold title for their land, while 19% reported no land possession documents whatsoever. Two percent of households reported being evicted, particularly in informal settlements and in poor areas. Twelve percent of male-headed households reported evictions whereas no female-headed households did.

The bottom portion of Table C.2 focuses on neighborhood mobility. Households reported living an average of six and a half years in their present dwelling, and almost two years longer in their present neighborhood. On average, poor households reported living in their dwellings and in the neighborhood significantly longer than non-poor households.

C.3: Distribution of Housing Values and Rents

Most respondents reported their home values to be between 9,000 KSh and 2.5 million KSh (84%); the average value was about 1.1 million. Note that very few households—106 in total—reported home values, so these results are likely unreliable.

Table C.3: Distribution of housing values and rents

Characteristic	All	Location		Household has...			HH head is... ^c		Gender (Informal)	
		Informal areas	Formal areas	Tenure	Water connection	A business	Skilled	Un-skilled	Male-headed	Female-headed
Average home value (1,000 KSh) ^a	1,116	<u>1,410</u>	<u>1076</u>	<u>1,475</u>	<u>2,464</u>	<u>1466</u>	<u>810</u>	<u>1,179</u>	<u>1,031</u>	<u>5198</u>
N	107	14	93	75	29	40	21	86	11	2
Distribution of home values: Total	100	100	100	100	100	100	100	100	100	100
1-8,999 KSh	6	<u>20</u>	<u>4</u>	<u>1</u>	<u>5</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>19</u>	<u>48</u>
9,000-299,999 KSh	47	<u>34</u>	<u>48</u>	<u>35</u>	<u>6</u>	<u>47</u>	<u>61</u>	<u>44</u>	<u>45</u>	<u>0</u>
300,000-999,999 KSh	17	<u>17</u>	<u>17</u>	<u>23</u>	<u>44</u>	<u>23</u>	<u>7</u>	<u>19</u>	<u>5</u>	<u>0</u>
1,000,000-2,499,999 KSh	20	<u>13</u>	<u>22</u>	<u>28</u>	<u>24</u>	<u>14</u>	<u>13</u>	<u>22</u>	<u>17</u>	<u>0</u>
2,500,000-250,000,000 KSh	10	<u>16</u>	<u>9</u>	<u>13</u>	<u>21</u>	<u>13</u>	<u>13</u>	<u>10</u>	<u>14</u>	<u>52</u>
N	106	14	92	75	29	40	21	85	11	2
Average monthly rent (tenants) ^b	2,200	<u>1,787</u>	<u>2,274</u>		<u>4,058</u>	<u>2,461</u>	<u>2,795</u>	<u>1,897</u>	2,001	1,481
N	694	101	593		212	138	238	456	65	32
Distribution of monthly rents: Total	100	100	100		100	100	100	100	100	100
1-899 KSh	18	<u>40</u>	<u>14</u>		<u>1</u>	<u>15</u>	<u>7</u>	<u>23</u>	41	35
900-1,499 KSh	18	<u>12</u>	<u>19</u>		<u>3</u>	<u>24</u>	<u>12</u>	<u>21</u>	9	16
1,500-1,999 KSh	15	<u>15</u>	<u>14</u>		<u>4</u>	<u>17</u>	<u>12</u>	<u>16</u>	12	19
2,000-3,499 KSh	31	<u>24</u>	<u>32</u>		<u>29</u>	<u>21</u>	<u>39</u>	<u>27</u>	26	24
3,500-150,000 KSh	18	<u>9</u>	<u>20</u>		<u>63</u>	<u>23</u>	<u>30</u>	<u>12</u>	11	5
N	694	101	593		212	138	238	456	65	32

Notes:

- Self-reported, current, monthly, fair-market price (response to the question, "If you were to sell your house, how much do you think you could sell it for?").
- Excludes imputed owner-occupied rents.
- Includes those self-declared as "skilled" as well as "professional".

Average rent is 2,200 KSh per month. Although, rent amount differences across categories of household location, land tenancy, access to water connection, business ownership or gender of the household head could not be tested for significance.

C.4: Neighborhood Social Capital and Civic Participation

Respondents that own their homes are more likely than renters to participate in their community. Twenty-three percent of owners attended local councils (compared to only 7% of renters) and 32% attended neighborhood forums (compared to 8% of renters); both proportions are significantly higher than the corresponding proportion of renters. Owners are also more likely to have voted in local elections and the 2007 general election—statistically significant differences. More renters participated in the 2010 referendum, but this difference is not statistically significant. Eighty-seven percent of male-headed households in informal areas reported voting in 2007 elections, compared to 57% of female-headed households, and 88% of male-headed households participated in the 2010 referendum, compared to 66% of female-headed households. These differences are statistically significant.

Almost half (45%) of respondents reported that they had an informal community or neighborhood leader. Very few respondents (3%) said that they had participated in a public demonstration or protest.

Table C.4a: Neighborhood social capital and civic participation

Characteristic	All	Location		Access to infrastructure ^a		Gender (Informal)		Tenure ^b	
		Informal areas	Formal areas	Lower half	Upper half	Male-headed	Female-headed	Own	Rent
Civic participation:									
Percent of households...contacting local council	11	15	11	15	9	14	15	23	7
N	1,013	137	876	347	666	88	43	246	767
attending a neighborhood forum	14	20	14	22	10	20	15	32	8
N	1,014	137	877	348	666	88	43	246	768
Social activism:									
Percent of households voting in... local election ^c	26	32	25	34	21	34	26	43	19
N	1,012	137	875	347	665	88	43	246	766
2007 general election ^c	69	78	67	70	68	87	57	75	66
N	1,013	137	876	348	665	88	43	246	767
2010 referendum ^c	74	82	73	69	77	88	66	71	75
N	1,013	137	876	348	665	88	43	246	767
Percent of households with informal community or neighborhood leader	45	45	45	51	41	43	41	63	37
N	834	114	720	318	516	73	36	224	610
Percent of households that took part in a public demonstration or protest	3	1	3	1	3	2	0	4	2
N	1,013	137	876	348	665	88	43	246	767

Notes:

a. Defined by dividing the population in half based on a score assigned using responses from thirteen infrastructure-related questions (see Section 3 of Introduction).

b. Alternatively, this could be the length of time living in the neighborhood: less/more than (say) 2 years.

c. Out of all households and not just those registered to vote.

The survey asked respondents whether people in their neighborhood would cooperate if asked by an official to conserve water or electricity because of an emergency, and whether people in their neighborhood look out for each other. On both questions, the results were positive. When asked if people in their community would cooperate if asked by an official, the results averaged 3.1 on a four-point scale (where 4=“very likely” and 1=“very unlikely” to cooperate). When respondents were asked if they agreed that people look out and trust each other in their neighborhood, answers averaged 4 on a five-point scale (where 1=“strongly disagree” and 5=“strongly agree”). On both questions, there were only slight differences between people with high and low access to infrastructure and between owners and renters; although these are statistically significant. Seventy-two percent of respondents said they felt safe in their own neighborhood. There are statistically significant differences by household location (74% of households in formal areas vs. 65% of households in informal areas) and by level of access to infrastructure, in the upper half of infrastructure access, 77% of respondents felt safe in their own neighborhood compared to 64% of respondents in the lower half.

Table C.4b: Neighborhood social capital and civic participation

Characteristic	All	Location		Access to infrastructure ^a		Gender (Informal)		Tenure ^b	
		Informal areas	Formal areas	Lower half	Upper half	Male-headed	Female-headed	Own	Rent
Social capital									
Average HH response to:									
People in my neighborhood cooperate if asked by an official ^c	3.1	3.1	3.1	3	3.1	3.1	3.1	3.2	3.1
N	987	133	854	342	645	84	43	246	741
People in my neighborhood look out for/trust each other ^d	4	4	3.9	4	3.9	3.9	4.1	4.1	3.9
N	1,004	137	867	344	660	88	43	246	758
Proportion of House holds feeling safe from crime in own neighborhood	72	65	74	64	77	60	70	77	70
N	1,014	137	877	348	666	88	43	246	768

Notes:

- a. Defined by assigning scores using responses from thirteen infrastructure-related questions.
- b. Alternatively, this could be the length of time living in the neighborhood: less/more than (say) 2 years.
- c. Four-point scale where 1=“Very unlikely” to 5=“Very likely”.
- d. Five-point scale where 1=“Strongly disagree” to 5=“Strongly agree”.

INFRASTRUCTURE SERVICES

D.1a: Water Access

Twenty-six percent of households have a private piped water connection in their dwelling, a proportion which is significantly higher among non-poor households (37%) than among poor households (14%). An additional 69% have piped water in their compound. This varies significantly by area type and poverty level. Finally, 73% of households are close (within 50 meters) to a source of piped water. On average, it takes respondents over one hour and 15 minutes a day to obtain water, including travel to and from the water source, waiting time, and filling time. Water costs an average of 459 KSh a month. Although there was not enough data at the census tract level to test for statistically significant differences between categories of households for the cost of water in time or money, we note that there are numerical differences. Households in formal areas spend more time but less money obtaining water than those in informal areas, female-headed households spend more money and less time obtaining water than their male-headed counterparts, and poor households spend more time and less money (405 KSh vs. 505 KSh) than wealthier households. However, these estimates are unreliable.

One-quarter of respondents report that piped water is their most important water source. But most households report shared tap connections as their primary source (61%). Vendors, neighbor(s), natural sources outside the household and wells or boreholes represent the primary water sources of almost 14% of households in Embu. Non-poor households are more likely than poor households to obtain piped water (37% vs. 13%), and are less likely to use shared tap connection (57% vs. 67%) than poor households. Something similar happens with households in formal areas that are less likely to obtain water from shared tap connections (45% vs. 64%) than households in informal areas; all differences are statistically significant. Also, poor households and those sitting on informal settlements are significantly more likely to obtain water from natural sources outside the household than households in formal areas. Of the households that didn't have access to piped water, the main reason given (43%) was their inability to afford the connection fee (although relatively few were unable to afford a water bill, 5%); the second most common reason (29%) was they rented rather than owned their home and their landlord would not pay for a connection. Seven percent of respondents reported there was no water service available, and only one percent said the water provider had a waiting list.

Table D.1a: Water access

Characteristic	All	Security of Ownership ^a			Location		House hold poverty		Gender (Informal)	
		Secure	Insecure	Rent	Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Percent of households with private piped water connection inside dwelling	26	21	20	27	23	26	14	37	23	27
N	1014	185	14	815	137	877	470	537	88	43
Percent of households with piped water connection in compound	69	74	67	68	59	71	74	65	57	66
N	1,014	185	14	815	137	877	470	537	88	43
Percent of households close to piped water access ^b	73	70	54	76	75	72	79	62	75	67
N	109	26	4	79	43	66	81	24	29	11
Monthly cost of water in ... Time (minutes) ^c	953	912	1252	950	644	1125	1066	627	652	548
N	123	29	4	90	49	74	87	32	32	15
Money (KSh)	459	498	521	435	499	453	405	505	404	775
N	523	154	10	359	63	460	227	293	42	19
Most important water source: Total	100	100	100	100	100	100	100	100	100	100
Piped	25	20	20	26	22	26	13	37	23	24
Bottled	0	0	0	0	0	0	0	0	0	0
Shared tap connection	61	60	38	62	45	64	67	57	41	51
Vendor (kiosk, tanker, other)	3	1	4	3	12	1	5	1	14	7
Neighbor(s)	4	4	14	3	7	3	6	1	8	6
Well/borehole	1	1	0	0	0	1	1	0	0	0
Natural source outside household	5	10	9	4	11	4	7	3	12	12
N	1,014	185	14	815	137	877	470	537	88	43
No connection due to:	100	100	100	100	100	100	100	100	100	100
Other sources available	7	7	0	7	2	9	8	3	0	8
Renting ^d	29	0	0	44	35	26	31	26	31	33
Can't afford connection	43	64	87	31	40	45	45	32	41	42
Can't afford monthly bill	5	10	13	2	8	3	3	13	8	8
Provider has waiting list	1	3	0	1	0	2	2	0	0	0
No service available	7	9	0	6	5	7	7	4	7	0
Other	8	8	0	9	10	7	5	22	12	8
N	109	26	4	79	43	66	81	24	29	11

Notes:

- Self-reported; "secure" includes owners who feel no one could force them to leave without an official legal process in which they would participate, "insecure" includes owners who feel they could be forced to leave without an official legal process, and "rent" includes renters, squatters, and people who own their structure but not land.
- Respondents were asked whether there were dwellings or businesses within 50 meters of their home that had a piped water connection in the dwelling or compound.
- Calculated as the sum of time spent travelling, waiting in line, and filling containers.
- House does not have a connection and landlord will not pay for one.

D.1b: Water Quality

Water quality is generally rated “good” or “fair,” although 46% of the households that obtain water from a natural source rate their water quality to be fair, and 40% of them rate it to be poor. The quality of piped water and water from shared tap connections was rated mostly good or fair.

Almost all respondents purchase their water from a public utility (71%). Only 32% of the households in Embu treat their water in any way, most of them concentrated among households above the poverty line but located in informal areas. Of those that treat water, 64%boil it and 57%add bleach or chlorine.

Table D.1b: Water quality

Characteristic		All	House hold poverty		Location		Water quality					Gender Informal)	
			Poor	Non-poor	Informal areas	Formal areas	Good	Fair	Poor	Total	N	Male-headed	Female-headed
Water source: ^a	Piped	25	13	37	22	26	71	27	<u>2</u>	100	296	23	24
	Bottled	0	<u>0</u>	<u>0</u>	0	0	-	-	-	100	0	0	0
Shared tap connection		61	67	57	45	64	68	<u>31</u>	<u>1</u>	100	595	41	51
Other vendor		3	5	1	12	1	49	<u>39</u>	<u>12</u>	100	24	14	7
Neighbor(s)		4	6	1	7	3	67	<u>24</u>	<u>9</u>	100	38	8	6
Well/Borehole		1	1	0	0	1	34	<u>54</u>	<u>12</u>	100	7	0	0
Natural outside-HH source		5	7	3	11	4	14	46	40	100	43	12	12
N		1,014	470	537	137	877	675	307	32			88	43
Water provider: Public		71	<u>67</u>	<u>74</u>	<u>80</u>	<u>70</u>	<u>72</u>	<u>28</u>	0	100	664	<u>83</u>	<u>77</u>
Private		15	<u>15</u>	<u>15</u>	<u>14</u>	<u>15</u>	<u>69</u>	<u>27</u>	3	100	138	<u>10</u>	<u>17</u>
Self		0	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	-	-	-	100	0	<u>0</u>	<u>0</u>
Community		14	<u>19</u>	<u>11</u>	<u>6</u>	<u>15</u>	<u>50</u>	<u>47</u>	4	100	103	<u>6</u>	<u>6</u>
N		905	389	513	94	811	634	262	9			59	32
Percent of households treating drinking water		32	26	37	42	30	44	49	7	100	324	37	50
N		1,014	470	537	137	877	675	307	32			88	43
Treatment method: ^b Boiling		64	<u>69</u>	<u>62</u>	<u>70</u>	<u>63</u>	<u>49</u>	<u>48</u>	<u>3</u>	100	215	<u>75</u>	<u>67</u>
Add bleach/chlorine		57	<u>35</u>	<u>48</u>	<u>34</u>	<u>45</u>	<u>39</u>	<u>50</u>	<u>11</u>	100	133	<u>33</u>	<u>19</u>
Other (sieve, filter, settle)		1	-	<u>1</u>	<u>1</u>	<u>0</u>	<u>35</u>	<u>65</u>	<u>0</u>	100	3	<u>2</u>	<u>0</u>
N		324	128	192	55	269	146	160	18			33	19

Notes:

a. Most important water source

b. Since multiple responses were permitted, the sum can exceed 100%. Likewise, “Other” is not shown, since it was negligible, so the sum may also be less than 100%.

D.2a: Electricity and Waste-Disposal Services

Sixty-four percent of respondents reported access to electricity, a figure that differs significantly by poverty (76% of non-poor vs. 52% poor) and settlement type (66% in formal vs. 49% in informal). Reasons for not having a connection are similar to those for water—the primary reason reported was their inability to pay for the initial connection (40%), followed by households that did not own their home and didn't have a choice (39%). Only 6% of respondents reported functional street lighting in their area, which significantly differs on a counterintuitive manner between poor and non-poor households (7% vs. 4%).

The average monthly bill for those with electricity is 660 KSh a month. Seven percent of households with electricity do not pay for it. Electricity payments are primarily made to the public utility (89%), although a few respondents pay their landlord instead (10%). Even when electricity is available, it is not reliable; 60% of respondents experience outages on a weekly basis or more. Sixty-nine of all households reported getting rid of their refuse by dumping it in their neighborhood or compound; this is significantly more common in informal areas than in formal settlements. This refuse disposal method is followed by burning (23%), and it is significantly more common in formal areas than in informal areas (24% vs. 16%). The proportion of households using a collection system is relatively small (3%).

Table D.2a: Access to electricity and waste disposal

Characteristic	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Electricity							
Proportion of households with access to electricity	64	49	66	52	76	47	56
N	1,014	137	877	470	537	88	43
Reason for no connection: Total	100	100	100	100	100	100	100
Renters	39	57	35	37	43	55	57
Firm has waiting list	7	2	8	7	8	1	4
Cannot afford connection	40	25	43	47	27	27	23
Cannot afford monthly bill	10	4	11	8	14	4	4
Other	4	11	3	2	9	12	12
N	349	69	280	226	119	45	20
Percent of households with mostly functioning street lighting	6	9	5	7	4	11	6
N	1,014	137	877	470	537	88	43
Average monthly bill, KShs	660	760	649	521	736	788	797
N	1,014	137	877	470	537	88	43
Percent of households not paying for electricity	7	11	6	9	6	15	5
N	431	43	388	139	289	29	12
Payment to: Total	100	100	100	100	100	100	100
Utility	89	98	88	86	91	96	100

Characteristic	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Prepaid card	0	0	0	0	0	0	0
Landlord	10	2	11	13	9	4	0
Third party (from utility power line)	0	0	0	0	0	0	0
N	400	37	363	128	269	24	11
Percent of households with outages at least once weekly	60	66	59	58	61	70	62
N	663	67	596	244	416	42	23
Refuse disposal							
Main method:							
Dumping	69	82	67	70	69	80	91
Burying	5	2	6	6	4	2	0
Burning	23	16	24	23	23	18	9
Collection system ^a	3	0	3	1	4	0	0
N	1,010	136	874	468	535	87	43
Proportion of HHs paying for collection	20	0	20	8	26	0	-
N	29	1	28	7	21	1	0

Notes:

a. Run by city, community, or private firm.

D.2b: Access to Sanitation Services

Only 24% of households reported to have a toilet in their home, and this significantly varies by poverty level; whereas 36% of non-poor households have a toilet at home, only 10% of poor households have one. Most households use a pit latrine (39%), a public/shared latrine (30%), or a flush toilet/WC (30%). Poor households and those in informal settlements are much more likely to use a public latrine. In contrast, non-poor households (45% vs. 14% among poor households) and those in formal areas (31% vs. 22% in informal areas) are more likely to use flush toilets and less likely to use individual or public latrines than poor households. A similar proportion of households that does not share toilets do share with 2 to 9 other households, 41% and 43%, respectively. Only 16% of households share a toilet with more than nine other families. Compared to households in informal areas, significantly more households in formal areas do not share toilets; while significantly fewer share with 10 or more other households. More non-poor households do not share the toilet than poor households (45% vs. 35%). Most toilets (68%) drain into pits; a fifth of them (20%) use toilets connected to a sewage system, and 12% have a septic tank instead. Households in formal areas are twice as likely to use toilets connected to sewage systems as households in informal areas; similarly, non-poor households are three times as likely to use sewage systems for disposal as poor households. In contrast, poor households are considerably more likely to use pit latrines than non-poor ones (84% vs. 54%).

“Grey water” (waste water from washing, cleaning, etc.) is generally poured out into the road or dumped down the drain. Households in informal settlements are more likely to dump their grey water down the drain, and less likely to pour it into the street. In addition, a larger proportion of non-poor households dump their grey water down the drain than that do poor households (47% vs. 31%), and poor households are more likely to dump it onto roads than non-poor households (57% vs. 40%)

Table D.2b: Access to sanitation

Characteristic	All	Location		HH poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Percent of households with toilet in home	24	17	25	10	36	14	20
N	1,014	137	877	470	537	88	43
Type of toilet system: Total							
Pit latrine (individual)	39	37	40	48	31	37	37
VIP latrine	0	0	0	0	0	1	0
Flush toilet/WC	30	22	31	14	45	22	22
Public/shared latrine	31	40	29	38	24	40	41
Paid shared latrine	0	0	0	0	0	0	0
N	1,013	137	876	469	537	88	43
Percent of households sharing toilet:							
Doesn't share	41	18	44	35	45	17	18
Shares with 2-9 other households	43	55	42	47	41	52	61
Shares with 10+ other households	16	27	14	18	14	31	21
N	1,001	135	866	466	528	86	43
Type of disposal system for toilet:							
Total	100	100	100	100	100	100	100
Pit latrine	68	71	68	84	54	75	67
Sewer (legal)	20	10	21	10	28	7	12
Sewer (informal)	0	1	0	0	0	1	0
Septic tank/soak pit	12	17	11	6	17	16	19
N	989	134	855	456	526	86	43
Disposal of "grey water": Total							
Total	100	100	100	100	100	100	100
Dump into drain	39	57	36	31	47	56	60
Pour onto road	49	37	50	57	40	38	34
Pour into latrine	3	2	3	3	3	2	1
Other	10	5	11	9	10	4	5
N	1,002	132	870	464	531	83	43

D.3: Access to Transport

Most individuals (59%) work or study outside their neighborhood rather than inside, followed by those that work or study inside their neighborhood (29%). Most respondents commute on foot (76%) or via matatu (14%).¹⁵ People in poor households are significantly more likely to walk, and typically less likely to use a matatu or a bike taxi than members of non-poor households. Furthermore, individuals from households in informal areas are four times as likely to drive their own vehicle as people from formal areas. In contrast, a considerably smaller proportion of individuals from informal settlements use matatu to commute than people that live in formal settlements (10% vs. 19%).

Table D.3: Access to transport

Characteristic	All	House hold activity ^a		Location		House hold poverty		Gender (Informal)	
		Work	Study	Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Percent who work or study...									
inside the neighborhood	29			<u>20</u>	<u>30</u>	<u>32</u>	<u>26</u>	23	16
outside the neighborhood	59			<u>64</u>	<u>59</u>	<u>57</u>	<u>62</u>	65	62
inside and outside the neighborhood	12			<u>16</u>	<u>11</u>	<u>10</u>	<u>13</u>	13	22
N	1,240			165	1,075	580	649	114	46
Main mode of travel ^b	76	<u>86</u>	<u>75</u>	83	75	84	67	78	92
Walk									
Bicycle	1	<u>1</u>	<u>0</u>	1	1	1	1	1	0
Own vehicle	2	<u>5</u>	<u>2</u>	4	1	1	2	6	0
Matatu	14	<u>2</u>	<u>17</u>	6	15	10	19	7	6
Shared taxi	0	<u>0</u>	<u>0</u>	0	0	0	0	0	0
Bike taxi	4	<u>3</u>	<u>0</u>	2	5	2	7	2	2
Municipal bus	1	<u>0</u>	<u>2</u>	1	1	1	2	1	0
N	1,612	147	58	205	1,407	793	809	139	60
Transport time (minutes)	22	<u>21</u>	<u>39</u>	26	21	21	22	24	29
N	1,601	146	58	204	1397	789	802	138	60
One-way trip cost to work/school (KSh)	119	<u>105</u>	<u>321</u>	<u>200</u>	<u>111</u>	<u>112</u>	<u>120</u>	<u>195</u>	<u>229</u>
N	368	16	15	31	337	122	243	27	4
Households with road access as: Poor	52			37	54	55	49	36	41
Good	48			63	46	45	51	64	59
N	1014			137	877	470	537	88	43
Percent of households with limited road access during rainy season	21			26	20	19	22	26	30
N	1014			137	877	470	537	88	43

Notes:

a. Informal areas only.

b. To work or to school. May not add to 100% since "Other", which was negligible, is not reported in table.

¹⁵ A "matatu" is a 14-seater minivan used throughout Kenya as a form of public transport.

Average one-way transport time is 22 minutes. Of the respondents that pay to travel, the average one-way cost is 119 KSh. Fifty-two percent of respondents said that their access to roads is poor and 48% of respondents in Embu said the quality of roads is good. Surprisingly, more people in formal settlements reported poor roads (54% vs. 37% of households in informal areas) while more people in informal settlements reported good access (63% vs. 46% of households in formal areas). Twenty-one percent of households have limited road access during the rainy season.

D.4: Access to Communications

While land lines are practically nonexistent among households in Embu, mobile phone ownership is widespread. Households own an average of 1.2 mobile phones. The number owned varies significantly by poverty level and the gender of the household head. A remarkably large number of those with mobile phones use mobile banking (64%), with significant differences by poverty level; whereas 74% of non-poor households use mobile banking, only 53% of the poor ones do. On the other hand, relatively few respondents have a computer (4%), though the rate of computer ownership is significantly higher among non-poor households. Twenty percent households reported accessing the internet using any means, a figure which is significantly higher among non-poor households than poor households (31% vs. 9%).

Table D.4: Access to communications

Characteristic	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Percent of households with functioning land line	0	0	0	0	1	1	0
N	1,014	137	877	470	537	88	43
Average number of mobile phones owned by household	1.2	1.1	1.2	1.1	1.3	1.2	0.7
N	1,013	137	876	469	537	88	43
Percent of households using mobile banking	64	68	63	53	74	69	60
N	1,013	137	876	470	536	88	43
Percent of households with functioning computer	4	6	3	2	5	8	0
N	1,014	137	877	470	537	88	43
Percent of households using internet (any means)	20	19	20	9	31	23	16
N	1,013	137	876	470	536	88	43

D.5: Access to Infrastructure Indicator

The access to infrastructure indicator combines six categories of infrastructure (divided into 13 subcategories) weighted by importance to the household and summed to create a household indicator from 0 to 9.5.¹⁶ Higher scores represent better access to infrastructure. This indicator provides an overall understanding of a household's infrastructure access. By averaging households' scores on the indicator, we can quickly compare infrastructure access in informal and formal areas, between poor and non-poor households, and between male- and female-headed households in informal areas.

Table D.5 presents household mean scores on the access-to-infrastructure indicator. The mean score across all households in Embu is 4.55. Non-poor households score significantly higher than poor households, the difference in mean scores is quite large—almost one point. There are also significant differences between households in formal and informal areas (4.01 vs. 4.64), but the magnitude of these differences is smaller than the difference between poor and non-poor households.

Table D.5: Access to infrastructure indicator

Characteristic	All	Location		House hold poverty		Gender (Informal)	
		Informal areas	Formal areas	Poor	Non-poor	Male-headed	Female-headed
Mean score on access to infrastructure indicator	4.55	4.01	4.64	4.09	5.00	3.87	4.32
N	1014	137	877	470	537	88	43

¹⁶ The 13 subcategories are: piped water (1 point); shared/indirect connection (0.5 points); direct electricity access (1); street lighting (0.5); garbage collection system (1); own toilet (1); shared toilet with less than 20 other people (0.5); legal sewer system for toilet (0.5); grey water not poured onto street (0.5); good road access at dwelling (0.5); road access not limited during rainy season (0.5); no flooding (1); no mudslides (1).

CONCLUSIONS

The following three figures are “Development Polygons”. These polygons are meant to complement the detailed tables presented in sections A through D by illustrating an “overall” sense of the state of the city. We present information for all areas, along with formal and informal areas, in each of the three figures: the Development Diamond, the Infrastructure Polygon, and the Living Conditions Diamond¹⁷. In all figures, the value labels included provide the value of the indicator for all areas. The statistics presented in these figures, of course, remain in the tables above. Similar graphics are also found in the City-at-a-Glance Reports and the Overview Report.

The axes for all figures represent percentages. A polygon with a larger area represents a “better” situation in regards to the data provided. Hence, a polygon with full coverage would indicate that the city is doing very well in terms of development, infrastructure, or living conditions. The Development Diamond (Figure 1) maps four indicators of poverty—welfare, employment, education, and living conditions. In all the quarters of the development diamond formal and informal areas are similarly situated. However, the living conditions indicator is considerably lower for the sample in Embu, only 24% of households have access to water in their dwellings or compounds, electricity and in formal areas far outpace the households in informal areas in terms of living conditions—in formal areas, a much larger percentage of households have permanent walls and access to both piped water and electricity (35% vs. 11% in informal areas and 28% overall).

The Infrastructure Polygon, shown in Figure 2, presents residents’ access to ten different types of infrastructure - piped water, electricity, private toilets, sewage, drainage, garbage collection, street lighting, mobile phones, public transport, and good roads. Piped water and electricity are much more prevalent in formal areas (91% and 66%) than informal areas (68% and 49%) though at least half of the population in all areas has access to piped water and electricity. Private toilets are much less common overall, but we still find large

Figure 1: Development diamond

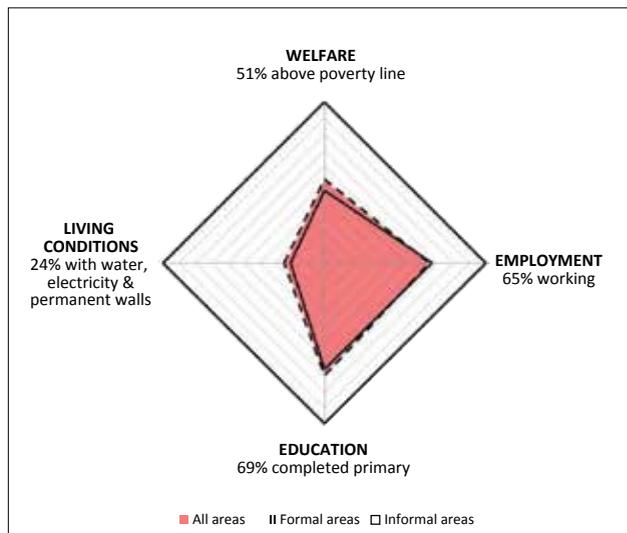
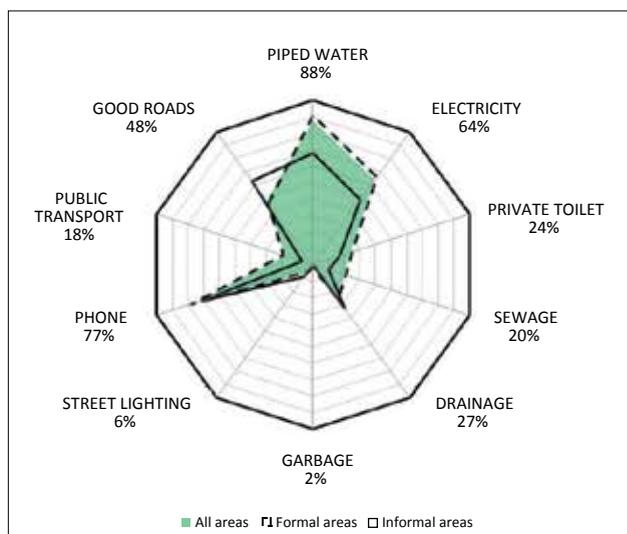


Figure 2: Infrastructure polygon

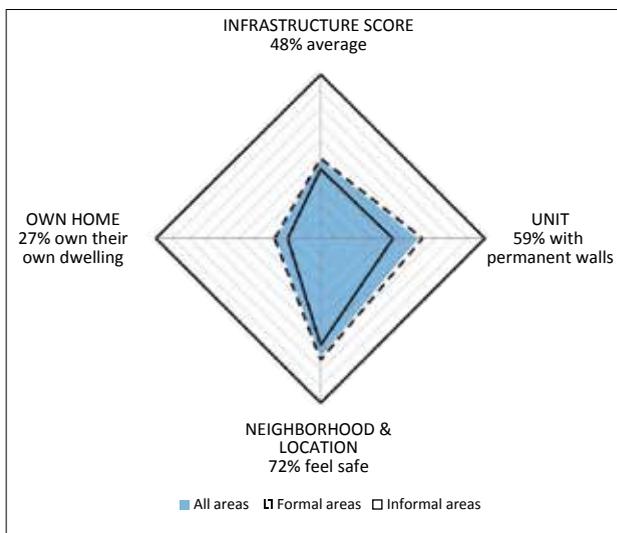


¹⁷ The basic format for all three figures appear in the World Bank Policy Research Working Paper, “Poverty, Living Conditions, and Infrastructure Access” A Comparison of Slums in Dakar, Johannesburg, and Nairobi” by Sumila Gulyani, Debabrata Talukdar, and Darby Jack (2010). We strived to make our own figures as similar as possible, though some deviations, noted in the accompanying text, were necessary.

differences by area type—only 17% of households in informal areas, compared to 25% in formal areas, have a private toilet. Sewage follows a similar trend. Twenty-seven percent of households or less have drainage and only 2% have garbage collection. Interestingly, more households in informal areas report functioning street lighting than do households in informal areas – 9% versus only 5%. Mobile phone usage is nearly ubiquitous, as 71% of households in informal areas and 78% of households in formal areas own one or more mobile phones. Eighteen percent of all households report using public transport, 7% in informal areas and 19% in formal areas. Finally, about half report good roads (63% in informal areas and 46% in formal areas).

Figure 3 presents the Living Conditions Diamond. The four axes of this diamond are the infrastructure score (scaled to a percentage), unit conditions, neighborhood and location, and home ownership. Three indicators—infrastructure, unit and neighborhood—have coverage around 50% with informal areas, as expected, scoring below formal areas. The largest difference between formal and informal areas occurs on the unit indicator - 44% of households in informal areas have permanent walls, while 62% of households in formal areas do. The rate of home ownership is 27% - 20% in informal areas and 28% in formal areas.

Figure 3: Living conditions diamond



World Bank Group

Delta Centre

Menengai Road, Upper Hill

P.O. Box 30577-00100

NAIROBI, KENYA

Telephone: +254-020-2936000

www.worldbank.org/en/country/kenya

BILL & MELINDA
GATES *foundation*

Cities Alliance
Cities Without Slums

